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TAP 1

CURRICULUM VITAE**1. PERSONAL INFORMATION:**

1.1 **NAME:** Darrell Lynn Peterson
1.2 **DATE AND PLACE OF BIRTH:** March 2, 1944; Pittsburg, KS
1.3 **CITIZENSHIP:** United States
1.4 **SOCIAL SECURITY NUMBER:**
1.5 **MARITAL STATUS/CHILDREN:** Married/two children
1.6 **HOME ADDRESS/TELEPHONE:** 4345 Roundhill Drive Chesterfield, VA 23832 (804) 276-9354

1.7 **OFFICE ADDRESS/TELEPHONE:** Department of Biochemistry
Room 212 Virginia Biotechnology Center
Box 980614 MCV Station
Richmond, VA 23298
(804) 828-5614

2. LICENSES: NOT APPLICABLE.**3. EDUCATION:**

PhD, Biochemistry, University of Notre Dame, 1970
BS, Biology, University of Notre Dame, 1966

4. MILITARY SERVICE RECORD:

U.S. Army, September 16, 1970 through March 20, 1972; Honorable Discharge

5. POSTDOCTORAL TRAINING:

University of Iowa. Post Doctoral Fellow (NIH). Department of Biochemistry, April 1972 through June 1975 (with Dr. R.L. Blakley).

6. ACADEMIC APPOINTMENTS:

University of California, San Francisco. Assistant Research Biochemist, June 1975 through June 1978 (with Dr. G.N. Vyas).

Virginia Commonwealth University. Department of Biochemistry, Assistant Professor, July 1978 through June 1984.

Virginia Commonwealth University. Department of Biochemistry, Associate Professor, July 1984 to 1990.

Virginia Commonwealth University. Department of Biochemistry, Professor, July 1990 to present.

7. MEMBERSHIP - SCIENTIFIC, HONORARY AND PROFESSIONAL SOCIETIES:

American Society of Biological Chemists.
American Chemical Society.

8. MEMBERSHIP IN COMMUNITY ORGANIZATIONS:

Irrelevant

9. SPECIAL AWARDS, FELLOWSHIPS AND OTHER HONORS:**9.1 Awards:****9.2 Fellowships:**

National Science Foundation Predoctoral Fellowship, 1966-1970.
National Institutes of Health Postdoctoral Fellowship, 1972-1975.

9.3. External Grants:

NIH AI15955 Structure of Hepatitis B Proteins.

NIH GM28143 (Jun 1980-Jun 1983) Physical and Structural Studies of Hydroxymethylases. Co-Investigator with Verne Schirch. (\$120000)

CIT Grant (Sep 1985-Aug 1986) Molecular Biological Approaches to the Understanding of the Antigenic Structure of Hepatitis B Surface Antigen. (\$55000 CIT/\$55000 Matching Industrial Support, Abbott Laboratories)

US Spain Cooperative Grant (NSF) CCA 8510-034, 1985-1988, \$120000

CIT Grant (Sep 1989-Aug 1991) Development of a Field Assay for Equine Infectious Anemia Virus. (\$47000 CIT/\$47000 matching industrial support (Centaur Inc.))

NATO Grant (for cooperative project with L. Aggerbeck, Gif sur Yvette, France) 1984-85. \$5000, travel only.

Johnson & Johnson Focused Giving Award 1992-1993 (\$170,000)

9.4 Invited Seminars:

INVITED PRESENTATIONS AT MEETINGS

1978 International Symposium on Viral Hepatitis (San Francisco)
1884 World Health Organization Meeting on Production of
Hepatitis B vaccine in Mammalian Cells (Geneva)
1984 Pan American Biochemistry Congress, Buenos Aires, Argentina
1987 International Symposium on Viral Hepatitis (London)
1989 International Symposium on Viral Hepatitis (Shanghai)
1990 AASLD Single Topic Conference: Immunology and the Liver
(Washington, DC)

INVITED SEMINARS AT OTHER INSTITUTIONS

UNIVERSITIES/RESEARCH INSTITUTIONS

National Institutes of Health, Infectious Diseases 1984
Pasteur Institute, Department of Molecular Virology, Paris, France, 1985
Molecular Genetics Center, National Center of Scientific Research, Gif-sur-
Yvette, France, 1985
College of William and Mary, 1986
University of Missouri, Kansas City, MO. 1987
Old Dominion University, 1990
University of Maryland, 1992

INDUSTRIES

Genentech, South San Francisco 1983
Abbott Laboratories, North Chicago, IL 1984, 1986, 1988
AmGen, Thousand Oaks, CA 1987
Biotronics Systems, Inc. Rockville, MD 1988, 1990
Synbiotics Inc., San Diego, CA 1990
Ortho Diagnostics, Inc, Raritan, NJ 1991, 1995
Phytera, Inc. Worcester MA 1995

10. MAJOR COMMITTEES:

10.1 University/Department:

Four Year I&I Curriculum Review Committee
Biochemistry Seminar Series Coordinator 1990-present

10.2 Professional--Panel, Boards, Councils:

National Research Council committee member for the
awarding of NSF predoctoral fellowships NIH ad hoc
member of various review panels

**11. OTHER SIGNIFICANT SCHOLARLY, RESEARCH OR ADMINISTRATIVE
EXPERIENCE:**

11.1 Graduate Students Trained:

Deborah Paul
Eloisa Guerrero
Pam Hannaman
James Lam
Beth Ann Antoni
Pei-sheng Hu
Jian Zheng
Sue Delos
Ashley Birkitt
Manisha Datta
Kevin Leach

11.2 Postdoctoral Trainees:

Francisco Gavilanes
Maria Teresa Villar-Lecumberi
Julian Gomez

11.3 Major Teaching Assignments:

Graduate Biochemistry (Bic 503-4) 1970-1981, 1995-present.
Undergraduate Biochemistry 1982-1985; 1997-present
Enzymology 1986-present
Bioorganic Chemistry 1987-88
M1 Biochemistry (1996)

12. BIBLIOGRAPHY:

12.1 Papers Published:

1. Martinez-Carrion, M., Tiemeier, D.C. and Peterson, D.L.: The structure and enzyme-coenzyme relationship of supernatant aspartate transaminase after dye sensitized photooxidation. J. Biol. Chem., 245:799-805, 1970.
2. Peterson, D.L. and Martinez-Carrion, M.: The mechanism of transamination: Function of the histidyl residue at the active site of supernatant aspartate transaminase. J. Biol. Chem., 245:806-813, 1970.
3. Martinez-Carrion, M., Tiemeier, D.C. and Peterson, D.L.: Conformational properties of the isoenzymes of aspartate transaminase and the enzyme-substrate complexes. Biochemistry, 9:2574-2582, 1970.
4. Casey, F.B., Eisenberg, J., Peterson, D.L. and Pieper, D.: Altered antigen uptake and distribution due to exposure to extreme environmental temperatures or sleep deprivation. 15:87-95, 1974.
5. Gleisner, J.M., Peterson, D.L. and Blakley, R.L.: The amino acid sequence of dihydrofolate reductase from *S. faecium* and the position of the reactive methionine residues. Proc. Natl. Acad. Sci. USA, 71:3001-3005, 1974.
6. Gleisner, J.M., Peterson, D.L. and Blakley, R.L.: The structure of dihydrofolate reductase: Partial sequence and the order of the limited tryptic and cyanogen bromide peptides. J. Biol. Chem., 250:4937-4944, 1975.
7. Peterson, D.L., Gleisner, J.M. and Blakley, R.L.: The structure of dihydrofolate reductase from *S. faecium*: The amino acid sequence of peptide CNBr-7 and the complete sequence of the enzyme. J. Biol. Chem., 250: 4945-4954, 1975.

RES,

8. Peterson, D.L., Gleisner, J.M. and Blakley, R.L.: Bovine liver dihydrofolate reductase: Purification and properties of the enzyme. *Biochemistry*, **14**:5261-5267, 1975.
9. Vyas, G.N., Roberts, I., Peterson, D.L. and Holland, P.V.: Nonspecific test reactions for antibodies to hepatitis B surface antigen in chronic HBsAg carriers. *J. Lab. Clin. Med.*, **82**:428-432, 1977.
10. Peterson, D.L., Roberts, I.M. and Vyas, G.N.: Partial amino acid sequence of two major component polypeptides of HBsAg. *Proc. Natl. Acad. Sci. USA*, **74**:1530-1534, 1977.
11. Luan Eng Lie-Injo, Ganesan, J., Randhawa, Z.I., Peterson, D.L. and Kane, J.P.: Hb Leiden-B thalassemia in a Chinese with severe hemolytic anemia. *Am. J. Hematology*, **2**:325, 1977.
12. Vyas, G.N., Peterson, D.L., Townsend, R.M., Damle, S.R. and Magnus, L.O.: Hepatitis B 'e' antigen: An apparent association with lactate dehydrogenase isozyme 5. *Science*, **198**:1068-1070, 1977.
13. Lie-Injo, L., Ganesan, J., Randhawa, Z.I., Kane, J. and Peterson, D.L.: Hemoglobin TAK in a newborn malay. *Hemoglobin*, **1**:747, 1977.
14. Schirch, L. and Peterson, D.: Purification and properties of mitochondrial serine hydroxymethyltransferase. *J. Biol. Chem.*, **255**:7801-7806, 1980.
15. Peterson, D.L.: Isolation and characterization of the major protein and glycoprotein of hepatitis B surface antigen. *J. Biol. Chem.*, **256**: 69756983, 1981.
16. Peterson, D.L., Nath, N. and Gavilanes, F.: Structure of hepatitis B surface antigen: Correlation of subtype with the amino acid sequence and location of the carbohydrate moiety. *J. Biol. Chem.*, **257**:10414-10420, 1982.
17. Gavilanes, F., Gonzalez-Ros, J. Manuel and Peterson, D.L.: Structure of hepatitis B surface antigen: Characterization of the lipid moiety. *J. Biol. Chem.*, **257**:7770-7777, 1982.
18. Dreesman, G., Sparrow, J.T. and Peterson, D.L.: Antibody to hepatitis B surface antigen after a single inoculation of uncoupled synthetic HBsAg peptides. *Nature*, **295**:158-160, 1982.
19. Lai, P., Pan, Y.E., Gleisner, J.M., Peterson, D.L. and Blakley, R.L.: Structure of dihydrofolate reductase: Primary sequence of the bovine liver enzyme. *Biochemistry*, **21**:3284-3294, 1982.
20. Gavilanes, F., Peterson, D. and Schirch, L.: Methylmethane thiosulfonate as an active site probe of serine hydroxymethyltransferase. *J. Biol. Chem.*, **257**:11431-11436, 1982.
21. Gavilanes, F., Peterson, D.L., Bullis, B. and Schirch, L.: Structure and Reactivity of cysteine residues in mitochondrial serine hydroxymethyltransferase. *J. Biol. Chem.*, **258**:13155-13159, 1983.

22. Barra, O., Martini, F., Angelaccio, S., Bossa, F., Gavilanes, F., Peterson, D., Bullis, B. and Schirch, L.: Sequence homology between prokaryotic and eukaryotic forms of serine hydroxymethyltransferase. *Biochem. Biophys. Res. Comm.*, **116**:1007-1012, 1983.
23. Srivastava, S., Sasser, G., Peterson, D.L., and Driska, S.P. Characterization of the fluorescein isothiocyanate reactive site of gizzard myosin ATPase. *Biochim. Biophys. Acta* **912**: 230-238 (1987).
24. Wright, C.S., Gavilanes, F. and Peterson, D.L.: Primary structure of wheat germ agglutinin, Isolectin II; Peptide order deduced from x-ray structure. *Biochemistry*, **23**:280-287, 1984.
25. Peterson, D.L., Paul, D.A., Lam, J. and Achord, D.T.: Antigenic structure of Hepatitis B surface antigen; Identification of the "d" subtype determinant by chemical modification and use of monoclonal antibodies. *J. Immuno.*, **132**:920-927, 1984.
26. Aggerbeck, L.P. and Peterson, D.L.: Electron Microscopic and Solution X-ray Scattering Observations on the Structure of HBsAg. *Virology* **141**: 155-161, 1985.
27. Milich, D.R., Peterson, D.L., Lerner, R.A. and Chipari, P.V.: Genetic Regulation of the Immune Response to HbsAg. *J. Immunology* **134**:396-407, 1985.
28. Peterson, D.L., Shires, T.K. and Krister, P.A.: Assessment of Internal Primary Structure of Polypeptides Newly Translated *in Vitro* by Reticulocyte Lysate: A Study with Cytochrome B5. *J. Applied Biochemistry* **7**: 396-407, 1985.
29. Paul, D.A., Purcell, R.H. and Peterson, D.L.: Use of Monoclonal Antibodies to Determine if HBsAg of Mixed Subtype is One Particle or Two. *J. Virol. Methods*, **13**:43-53, 1986.
30. Peterson, D.L.: The structure of hepatitis B surface antigen and its antigenic sites. *Bioassays*, **6**:258-262, 1987.
31. Hu, Peisheng, Fiorenza, V., Carithers, R. and Peterson, D.L.: Quantitative studies of the hepatitis B viral pre-S proteins. *J. Virol. Met.*, **16**:97-114, 1987.
32. Gillette-Castro, B., Fisher, S.J., Tarentino, A.L., Peterson, D.L. and Burlingame, A.L.: Structure of the oligosaccharide portion of human hepatitis B surface antigen. *Arch. Biochem. Biophys.*, **256**:194-201, 1987.
33. Antoni, Beth, and Peterson, D.L.: Site Directed Mutagenesis of the Hepatitis B Surface Antigen Gene. *Viral Hepatitis and Liver Disease*, (A.J. Zuckerman, Ed.) Alan R. Liss. pp. 313-317, 1988.
34. Hu, Peisheng and Peterson, D.L.: Use of Monoclonal and Antipeptide Antibody to Study the Structure and Arrangement of the Pre-S Proteins of Hepatitis B Surface Antigen. *Viral Hepatitis and Liver Disease* (A.I. Zuckerman, Ed.) Alan R. Liss, pp. 318-322, 1988.

35. Guerrero, E., Gavilanes, F., Peterson, D.L.: Model for the Protein Arrangement in HBsAg Particles Based on Physical and Chemical Studies. *Viral Hepatitis and Liver Disease*, (A.J. Zuckerman, Ed.) Alan R. Liss, pp. 606-613, 1988.
35. Swenson, P., Peterson, D.L. and Hu, Peisheng: Antigenic Analysis of HBsAg with Monoclonal Antibodies Specific for S Protein and Pre-S2 Sequences. *Viral Hepatitis and Liver Disease* (A.J. Zuckerman, Ed.) Alan R. Liss, pp. 627-631, 1988.
36. Bitter, G.A., Egan, K.M., Burnette, W.A., Saml, B., Fieschko, J.C., Peterson, D.L., Downing, M.R., Wypych, J., and Langley, K. Hepatitis B vaccine produced in yeast. *J. Med. Virol.* 25:123 -140, 1988.
37. Guerrero, E., Swenson, P.D., Hu, P. and Peterson, D.L.: Antigenic structure of HBsAg: Study of the d/y subtype determinant by chemical modification and site directed mutagenesis. *Mol. Immunol.* 27:435-441, 1990.
38. Gavilanes, F., Gomez-Gutierrez, J., Aracil, M., Gozales-Ros, J.M., Ferragut, J.A., Guerrero, E. and Peterson, D.L.: Hepatitis B surface antigen: Role of lipids in maintaining the structure and antigenicity of proteins. *Biochem. J.* 265:857-864, 1990.
39. Dertzbaugh, M.T., Peterson, D.L. and Macrina, F.L.: Modification of cholera toxin B subunit by genetic fusion to a streptococcal peptide: Structural and functional analysis of the chimeric protein. *Infect. Immun.* 58:70-79, 1990.
40. Delos, S., Villar, M., Hu, P., and Peterson, D.L. Cloning, expression, isolation, and characterization of the pre-S domains of HBsAg devoid of the S protein. *Biochem. J.* 276: 411-416, 1991.
41. Schodel, F., Moriarty, A.M., Peterson, D., Zheng, J., Milich, D. The Position of Heterologous Epitopes Inserted in Hepatitis B Virus Core Particles Determines their Immunogenicity. *J. Immunol.* 66:106-114, (1992).
42. Gomez-Gutierrez, J., Rodriguez-Crespo, I., Gonzalez-Ros, J.M., Ferragut, J.A., Paul, D.A., Peterson, D.L. and Gavilanes, F. Thermal stability of hepatitis B surface antigen S proteins. *Biochem. Biophys. Acta* 1119, 225-231, 1992.
43. Zheng, J., Schodel, F., and Peterson, D.L. The Structure of Hepadnaviral Core Antigens: Identification of free thiols and determination of the disulfide bonding pattern. *J. Biol. Chem.* 267, 9422-9429, (1992).
44. Schodel, F., Moriarty, A.M., Peterson, D., Zheng, J., Milich, D. The position of heterologous epitopes inserted in Hepatitis B virus core particles determines their immunogenicity. *J. Immunol.* 66, 106-114 (1992).
45. Gomez-Gutierrez, J., Rodriguez-Crespo, I., Gonzalez-Ros, J.M., Ferragut, J.A., Paul, D.A., Peterson, D.L., and Gavilanes, F. Thermal stability of hepatitis B surface antigen S proteins. *Biochem. Biophys. Acta* 1119, 225-231

(1992)

46. Cote, P.J., Ronaker, C., Cass, K., Schodel, F., Peterson, D., Tennant, B., DeNoronka, P., and Gerin, J. New enzyme immunoassays for the serological detection of woodchuck hepatitis virus infection. *Viral Immunol.* 6, 161-169 (1993)
47. Schodel, F., Peterson, D., Zheng, J., Jones, J.E., Hughes, J.L., and Milich, D.R. Structure of hepatitis B virus core and E antigen: A single precore amino acid prevents nucleocapsid assembly. *J. Biol. Chem.* 268, 1332-1337 (1993).
48. Bichko, V., Schodel, F., Nassal, M., Gren, E., Berzins, I., Borisova, G., Miska, S., Peterson, D.L., Pushko, P., and Will, H. Epitopes recognized by antibodies to denatured core protein of hepatitis B virus. *Mol. Immunol.* 30, 221-231 (1993).
49. Schodel, F., Neckermann, G., Peterson, D.L., Fuchs, K., Fuller, S., Will, H., and Roggendorf, M. Immunization with recombinant woodchuck hepatitis virus nucleocapsid antigen or hepatitis B virus nucleocapsid antigen protects woodchucks from woodchuck hepatitis virus infection. *Vaccine* 11, 624-628 (1993)
50. Schodel, F., Peterson, D.L., Zheng, J., Jones, J.E., Hughes, J.C., and Milich, D.R. Avirulent salmonella expressing hybrid hepatitis B virus core/preS genes for oral vaccine. *Vaccine* 11, 143-8 (1993)
51. Antoni, B., Rodriguez-Crespo, I., Gomez-Gutierrez, J., Nieto, M., Peterson, D.L., and Gavilanes, F. Site directed mutagenesis of cysteine residues of hepatitis B surface antigen. Analysis of two single mutants and the double mutant. *Eur. J. Biochem.* 222, 121-127 (1994).
52. Gomez-Gutierrez, J., Rodriguez-Crespo, I., Peterson, D.L., and Gavilanes, F. Reconstitution of hepatitis B surface antigen proteins into phospholipid vesicles. *Biochim. Biophys. Acta*, 1192, 45-52 (1994).
53. Maruyama, T., Schodel, F., Iino, S., Koike, K., Peterson, D., and Milich, D. Distinguishing between acute and symptomatic chronic hepatitis B virus infection. *Gastroenterology* 106, 1006-1015 (1994).
54. Schodel, F., Wirtz, R., Peterson, D., Hughes, J., Warren, and Milich, D. Immunity to malaria elicited by hybrid hepatitis B virus core particles carrying circumsporozoite protein epitopes. *J. Exp. Med.* 180, 1037-1046 (1994).
55. Rodriguez-Crespo, I., Gutierrez, J., Nieto, M., Peterson, D.L., and Gavilanes, F. Prediction of a putative fusion peptide in the S protein of hepatitis B virus. *J. Gen. Virol.* 75, 637-639 (1994).
56. Schodel, F., Peterson, D.L., Hughes, J., and Milich, D. Hepatitis B Virus core particles as a vaccine carrier moiety. *Intern. Rev. Immunol.* Vol 11, 153-165 (1994).
57. Schodel, F., Kally, S.M., Peterson, D.L., Milich, D.R., and Curtiss, R. (1994) Hybrid hepatitis B virus core-pre-S proteins synthesized in avirulent *Salmonella typhimurium*

- and *Salmonella typhi* for oral vaccination. *Infect. Immun.* 62, 1669-1676.
58. Rodriguez-Crespo, I., Nunez, E., Gomez-Gutierrez, J., Velamos, B., Albar, J.P., Peterson, D.L., and Gavilanes, F. Phospholipid interactions of the putative fusion peptide of hepatitis B virus surface antigen S protein. *J. Gen. Virol.* 76, 301-308 (1995)
 59. Hopkins, S., Kraehenbuhl, J., Schodel, F., Potts, A., Peterson, D. and Nardelli-Haeffliger, D. (1995) A recombinant *Salmonella typhimurium* vaccine induces local immunity by four different routes of immunization. *Infect. Immun.* 63, 3279-3286.
 60. Milich, D., Peterson, D., Zhang, J., Hughes, J., Wirtz, R., and Schodel, F. (1995) The hepatitis nucleocapsid as a vaccine carrier moiety. *Ann. NY Acad Sci* 754, 187-201.
 61. Milich, D., Schodel, F., Peterson, D., Jones, J., and Hughes, J. (1995) Characterization of self-reactive T cells that evade tolerance in hepatitis B e antigen transgenic mice. *Eur J Immunol* 25, 1663-1672.
 62. Milich, D., Peterson, D., Schodel, F., Jones, J., and Hughes, J. (1995) Preferential recognition of hepatitis B nucleocapsid antigens by Th1 or Th2 cells is epitope and major histocompatibility complex dependent. *J. Virol.* 69, 2776-2785.
 63. Jin, L., Wei, X., Gomez, J., Datta, M., Birkett, A., and Peterson, D.L. (1995) Use of α -N,N bis carboxymethyl lysine modified peroxidase in immunoassays. *Anal. Biochem.* 229, 54-60 (1995)
 64. Jin, L. and Peterson, D.L. Expression, isolation, and characterization of the hepatitis C virus ATPase/RNA helicase. *Arch. Biochem. Biophys.* 323, 47-53 (1995).
 65. Gomez-Gutierrez, J., Rodriguez-Crespo, I., Peterson, D.L., and Gavilanes, F. (1995) Antigenicity of hepatitis B surface antigen proteins reconstituted with phospholipids. *Biochim Biophys Acta* 1233, 205-22.
 66. Wei, X. and Peterson, D.L. Expression, Purification, and Characterization of an Active RNase H Domain of the Hepatitis B Viral Polymerase. *J. Biol. Chem.* 271, 32617-32622 (1996).
 67. Schodel, F., Peterson, D.L., and Milich, D. Hepatitis B virus core and e Antigen: Immune recognition and use as a vaccine carrier moiety. *Intervirology* 39, 104-110 (1996)
 68. Rodriguez-Crespo, I., Gomez-Gutierrez, J., Encinar, J.A., Gonzalez-Ros, J.M., Albar, J.P., Peterson, D.L., and Gavilanes, F. Structural properties of the putative fusion peptide of hepatitis B virus upon interaction with phospholipids. Circular dichroism and Fourier-transform infrared spectroscopy studies. *Eur. J. Biochem.* 242, 243-248 (1996).
 69. Sallberg, M., Zhang, Z.S., Chen, M., Jin, L., Birkett, A., Peterson, D.L., and Milich, D.R. Immunogenicity and antigenicity of the ATPase/helicase domain of the hepatitis C

- virus non-structural 3 protein. *J. Gen. Virol.* 77, 2721-2728 (1996)
70. Schodel, F., Peterson, D.L., Hughes, J., Wirtz, R., and Milich, D. Hybrid hepatitis B virus core antigen as a vaccine carrier moiety: I. presentation of foreign epitopes. *J. Biotechnol.* 44, 91-96 (1996)
 71. Schodel, F., Peterson, D.L., and Milich, D. (1996) Hepatitis B virus core and e antigen: Immune recognition and use as a vaccine carrier moiety. (1996) *Intervirology* 39, 104-110.
 72. Viscount, H.B., Munro, C.L., Burnette-Curley, D., Peterson, D.L., and Macrina, F.L. Immunization with FimA protects against *Streptococcus parasanguis* endocarditis in rats. *Infect. and Immun.* 65, 994-1002. (1997)
 73. Milich, D.R., Schodel, F., Hughes, J.L., Jones, J.E., and Peterson, D.L. (1997) The hepatitis B virus core and e antigens elicit different Th cell subsets: antigen structure can affect Th cell phenotype. *J. Virol* 71, 2192-2201.
 74. Birkett, A.J., Yelamos, B., Rodriguez-Crespo, I., Gavilanes, F., and Peterson, D.L. (1997) Cloning, expression, purification, and characterization of the major core protein (p26) from equine infectious anemia virus. *Biochim. Biophys. Acta* 1139, 62-72.
 75. Zhang, Z.X., Milich, D.R., Peterson, D.L., Birkett, A., Schvarcz, R., Weiland, O., Sallberg, M. (1997) Interferon-alpha treatment induces delayed CD4 proliferative responses to the hepatitis C virus nonstructural protein 3 regardless of the outcome of therapy. *J. Infect. Dis.* 175, 1294-1301.
 76. Milich, D.R., Chan, M., Schodel, F., Peterson, D.L., Jones, J.E., and Hughes, J.L. (1997) Role of B cells in antigen presentation of the hepatitis B core. *Proc Natl Acad Sci USA* 94, 14648-14653.
 77. Jin, Z., Jin, L., Peterson, D.L., and Lawson, C.L. (1999) Model for lentivirus capsid core assembly based on crystal dimers of EIAV p26. *J. Mol Biol.* 12, 83-93.
 78. Rodriguez-Crespo, I., Nunez, E., Yelamos, B., Gomez-Butierrez, J., Albar, J.P., Peterson, D.L., and Gavilanes, F. (1999) Fusogenic activity of hepadnavirus peptides corresponding to sequences downstream of the putative cleavage site. *Virology* 261, 133-142.
 79. Yelamos, B., Nunez, E., Gomez-Gutierrez, J., Datta, M., Pacheco, B., Peterson, D.L., and Gavilanes, F. (1999) Circular dichroism and fluorescence spectroscopic properties of the major core protein of feline immunodeficiency virus and its tryptophan mutants. *Eur J. Biochem.* 266, 1081-1089.
 80. Zhang, Z., Lazdina, U., Chen, M., Peterson, and Sallberg, M. (2000) Characterization of a monoclonal antibody and its single-chain antibody fragment recognizing the nucleoside triphosphatase/helicase domain of the hepatitis C virus nonstructural 3 protein. *Clin Diagn Lab Immunol* 7, 58-63.
 81. Rodriguez-Crespo, I., Yelamos, B., Albar, J.P., Peterson, D.L., and Gavilanes, F. (2000) Selective destabilization of acidic phospholipid bilayers performed by the hepatitis B virus fusion peptide. *Biochim Biophys Acta* 1463, 419-428.
 82. Valdez, H., Anthony, D., Farukhi, F., Patki, A., Salkowitz, J., Heeger, P., Peterson, D.L., Post, A.B., Assad, R., Lederman, M.M. (2000) Immune responses to hepatitis C and non-hepatitis C antigens in hepatitis C virus infected and HIV-1 coinfecting patients. *AIDS* 14, 2239-2246.
 83. Nunez, E., Wei, X., Delgado, C., Rodriguez-Crespo, I., Yelamos, B., Gomez-Gutierrez, J., Peterson, D.L., and Gavilanes, F. (2001) Cloning, expression, and purification of histidine-tagged preS domains of hepatitis B virus. *Protein Expr. Purif.* 21, 183-191.
 84. Yelamos, B., Nunez, E., Gomez-Gutierrez, J., Delgado, C., Pacheco, B., Peterson, D.L., and Gavilanes, F. (2001) Urea equilibrium unfolding of the major core protein of the retrovirus feline immunodeficiency virus

- and its tryptophan mutants. *Biochim Biophys Acta* 1546, 87-97.
85. Anthony, D., Post, A., Valdez, H., Peterson, D.L., Murphy, M., and Heeger, P.S. (2001) ELISPOT analysis of hepatitis C virus protein-specific IFN- γ -producing peripheral blood lymphocytes in infected humans with and without cirrhosis. *Clin Immunol.* 99, 232-240.
86. Lazdina, U., Hultgren, D., Frelin, L., Chen, M., Lodin K., Weiland, O., Leroux-Roels, G., Quiroga, J.A., Peterson, D.L., Milich, D.R., and Sallberg, M. (2001) Humoral and CD4+ T helper (Th) cell responses to the hepatitis C virus non-structural 3 (NS3) protein: NS3 primes Th1-like responses more effectively as a DNA-based immunogen than as a recombinant protein. *J Gen Virol* 82, 1299-1308.
87. Lazdina U., Cao T., Steinbergs J., Alheim M., Pumpens, P., Peterson, D.L., Milich, D.R., Leroux-Roels, G., Sallberg, M. (2001) Molecular basis for the interaction of the hepatitis B virus core antigen with the surface immunoglobulin receptor on naive B cells. *J. Virol.* 75, 6367-6374.
88. Nath, M.D., and Peterson, D.L. (2001) In vitro assembly of feline immunodeficiency virus capsid protein: Biological role of conserved cysteines. *Arch Biochem Biophys* 392, 287-294.
89. Baz, E.M., Zheng, J., Mazuruk, K., Van Le, A., and Peterson, D.L. (2001) Characterization of a novel hepatitis B virus mutant: demonstration of mutation-induced hepatitis B virus surface antigen group specific "a" determinant conformation change and its application in diagnostic assays. *Transfusion Medicine* 11, 355-362.
90. Paoletti LC, Peterson, DL, Legmann, R., and Collier, RJ. (2001) Preclinical evaluation of group B streptococcal polysaccharide conjugate vaccines prepared with a modified diphtheria toxin and a recombinant duck hepatitis B core antigen. *Vaccine* 12, 370-376.
91. Vanlandschoot, P., Van Houtte, F., Roobrouck, A., Farhoudi, A., Stelter, F., Peterson, D.L., Gomez-gutierrez, J., Gavilanes, F., and Leroux-Roels, G. (2002) LPS-binding protein and CD14 dependent attachment of hepatitis B surface antigen to monocytes is determined by the phospholipid moiety of the particles. *J. Gen Virol* 83, 2279-2289.

12.2 Abstracts

1. Peterson, D.L. and Gavilanes, F.: Structural Studies of the major protein and glycoprotein of hepatitis B surface antigen. Third Pan American Biochemistry Congress, Mexico City, MEXICO 1981.
2. Peterson, D.L. and Gavilanes-Franco, F.: The structure of hepatitis B surface antigen: Correlation of protein sequence with antigenic subtype and attachment site of carbohydrate. Third International Symposium on Viral Hepatitis, New York, 1981.
3. Peterson, D.L., Schirch, L.G. and Gavilanes, F.: Methyl methanethiosulfonate as an active site probe of serine hydroxymethyl transferase. *Fed. Proc.* 41:1178, 1982.
4. Aggenbeck, L.P. and Peterson, D.L.: Etude de la Structure du HBsAg. Societe Francaise de Biophysique, Sept. 22-24, 1983, Gif-sur-Yvette, FRANCE.
5. Milich, D.K., Leroux-Roels, G.G., Peterson, D.L., Lerner, R.A. and Chisari, F.V.: Identification of distinct T cell determinants on HBsAg. 1984 International Symposium on Viral Hepatitis, San Francisco.
6. Peterson, D.L., Purcell, R.H. and Paul, D.A.: Use of monoclonal antibodies to determine if HBsAg (adyw) is one

- particle or two. 1984 International Symposium on Viral Hepatitis, San Francisco.
7. Paul, D.A. and Peterson, D.L.: Monoclonal antibodies and chemical modification studies to define the antigenic sites of HBsAg. 1984 International Symposium on Viral Hepatitis, San Francisco.
 8. Milich, D.R., Peterson, D.L., Lerner, R.A. and Chisari, F.V.: Distinct T cell determinants on HBsAg: Evidence "agretope epitope" T cell recognition sites. Fed. Proc., 43:1658, 1984.
 9. Guerrero, E., Hu, Pei Sheng and Peterson, D.L.: Structural Studies of HBsAg Antigenic Sites. FASEB, Washington, D.C., 1986.
 10. Peterson, D.L.: Structure of Hepatitis B Surface Antigen and Its Antigenic Sites. SCBA International Meeting on Hepatitis B., San Francisco, 1986.
 11. Gavilanes, F., Gomez-Gutierrez, J. and Peterson, D.L.: Hepatitis B surface antigen: Role of lipids in maintaining the structure and function of proteins. First Spanish/Soviet Congress of Biophysics: Biomembranes, 1987, Granada, Spain.
 12. Swenson, P.D., Peterson, D.L. and Hu, P.: Antigenic Analysis of HBsAg with monoclonal Antibodies Specific for S Protein and Pre-S2 Sequences. Proceedings of the 6th International Symposium on Viral Hepatitis. London, UK 1987.
 13. Hu, P. and Peterson, D.L.: Use of Monoclonal and Anti-peptide Antibodies to Study the Structure and Arrangement of the Pre-S Proteins of HBsAg. Proceedings of the 6th International Symposium on Viral Hepatitis. London, UK 1987.
 14. Guerrero, E. and Peterson, D.L.: A Model for the Protein Arrangement in HBsAg Particles Based on the Results of Physical and Chemical Studies. Proceedings of the 6th International Symposium on Viral Hepatitis. London, UK 1987.
 15. Antoni, B. and Peterson, D.L.: Site Directed Mutagenesis of the Hepatitis B Surface Antigen Gene: Creation of a Free Sulfhydryl Group and Modification of the Protein in the 22nm Particle Structure. Proceedings of the 6th International Symposium on Viral Hepatitis. London, UK 1987.
 16. Hu, P. and Peterson, D.L.: Location of the polymerized human serum albumin binding site on hepatitis B surface antigen. ASBC, 1988, Las Vegas, Nevada, Abstract 6248.
 17. Guerrero, E. and Peterson, D.L.: Study of the subtype determinants on the hepatitis B surface antigen by oligonucleotide site directed mutagenesis. ASBC, 1988, Las Vegas, Nevada, Abstract 6249.

18. Antoni, B.A. and Peterson, D.L.: Disulfide bond analysis in hepatitis B surface antigen by mutagenesis of cysteine by mutagenesis of cysteine residues within the major antigenic determinant region. ASBC, 1988, Las Vegas, Nevada, Abstract 6020.
19. Delos, S. and Peterson, D.L.: Cloning, Expression, and Partial Purification of the Pre J1 Pre J2 Segment of the Hepatitis B Viral Surface Protein. 1990 International Symposium on Viral Hepatitis, Houston, Tx.
20. J. Zheng and Peterson, D.L.: Expression, Isolation, and Characterization of HBeAg and HBcAg in E. coli. 1990 International Symposium on Viral Hepatitis, Houston, TX.
21. Villar, M.T. and Peterson, D.L.: Study of HbsAg/AyW Antigenic Region by Site Directed Mutagenesis. 1990 International Symposium on Viral Hepatitis, Houston, TX.
22. Jin, Z. Birkett, A., Jin, L., Peterson, D.L., and Lawson, C.L. Crystallization of EIAV p26. XVII Congress and General Assembly of the International Union of Crystallography, August 8-17, 1996, Seattle Washington.
- 12.3 Books and/or Chapters:

1. M. Martinez-Carrion and D.L. Peterson, "The role of a histidyl residue at the active site of glutamate aspartate transaminase," Metabolic Regulation and Enzyme Action, eds. A. Sols and S. Grisolia, New York: Academic Press, 1970, pp. 229-239.
2. Peterson, D.L., Chien, D.Y., Vyas, G.N., Nitecki, D., and Bond, H.E.: "Characterization of Polypeptides of HbsAg for the proposed 'UC vaccine' for hepatitis B," in Viral Hepatitis, eds. G.N. Vyas, S.N. Cohen, and R.S. Schmid, Philadelphia: Franklin Inst. Press, 1978.
3. Schirch L., Moos, E.D. and Peterson, D.L.: "Properties of the Multi-functional Enzyme Formylmethenylmethylenetetrahydrofolate Synthetase (combined) from Rabbit Liver," in Chemistry and Biology of Pteridines, eds. R.L. Kisluk and G.M. Brown, Elsevier/North-Holland, 1979, pp. 495-500.
4. Lai, P., Gleisner, J.M., Peterson, D.L. and Blakley, R.L.: "Primary Sequence of Bovine Liver Dihydrofolate Reductase," in Chemistry and Biology of Pteridines, eds. R.L. Kisluk and G.M. Brown, Elsevier/North-Holland, 1979, pp. 437-440.
5. Peterson, D.L. and Schirch, L.: "Structural studies on formyl-methenyl-methylene tetrahydrofolate synthetase from rabbit liver," in Chemistry and Biology of Pteridines, ed. J.A. Blair, New York: Walter de Gruyter & Co., 1983, pp. 597-601.
6. Schirch, L., Gavilanes, F., Peterson, D.L., Bullis, B., Barra, F.: "Structural studies on rabbit liver cytosolic and mitochondrial isozymes of serine hydroxymethyltransferases," in Chemical and Biological Aspects of Vitamin B₆ Catalysis, New York: Alan R. Liss, Inc., 1984, pp. 301-308.

7. Peterson, D.L., Gavilanes, F., Paul, D. and Achord, D.: Hepatitis B Surface Antigen: "Protein Structure and the Development of Alternative HBV Vaccines," in Hepatitis Research, ed. F. Chisari, Masson Publishing USA, 1984, pp. 30-39.
8. Milich, D.R., Peterson, D.L. and Chisari, F.V.: Comparison of T Cell and B Cell Immune Recognition of HBsAg. In: Viral Hepatitis and Liver Disease, Vyas, GN (ed), Grune Stratton, USA, 1984, pp 573-582.
9. Guerrero, E., Gavilanes, F. and Peterson, D.L.: Model for the protein arrangement in HBsAg particles based on physical and chemical studies. In: Viral Hepatitis and Liver Disease, Zuckerman, A. (ed), Alan R. Liss, Inc., New York, 1988, pp. 606-613.
10. Hu, P. and Peterson, D.L.: Use of monoclonal and antipeptide antibodies to study the structure and arrangement of the pre-S proteins of hepatitis B surface antigen. In: Viral Hepatitis and Liver Disease, Zuckerman, A. (ed), Alan R. Liss, Inc., New York, 1988, pp. 318-322.
11. Antoni, B.A. and Peterson, D.L.: Site directed mutagenesis of the hepatitis B surface antigen gene. In: Viral Hepatitis and Liver Disease, Zuckerman, A. (ed), Alan R. Liss, Inc., New York, 1988, pp. 313-317.
12. Swenson, P.D., Peterson, D.L. and Hu, P.: Antigenic analysis of HBsAg with monoclonal antibodies specific for S protein and pre-S2 sequences. In: Viral Hepatitis and Liver Disease, Zuckerman, A. (ed), Alan R. Liss, New York, 1988, pp. 627-631.

12.4 Other--Reviews, Exhibits, Films, Tapes, Etc.:

PATENTS

AWARDED:

Cyclic peptide and method of use for inducing an immunological response to hepatitis B virus
4,778,784 Issued Oct 18, 1988

Assay for equine infectious anemia virus.
5,427,907 issued Jun 27, 1995

Immunoassay technique using histidine tags, metals, and chelating agents.
5,674,677 Issued Oct 7, 1997.

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NO.369 022

Method for diagnosing chronic hepatitis B virus infection.
5,726,011 issued Mar 10, 1998

Advanced antigen presentation platform. Patent Number: 6,887,464
issued May 3, 2005

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